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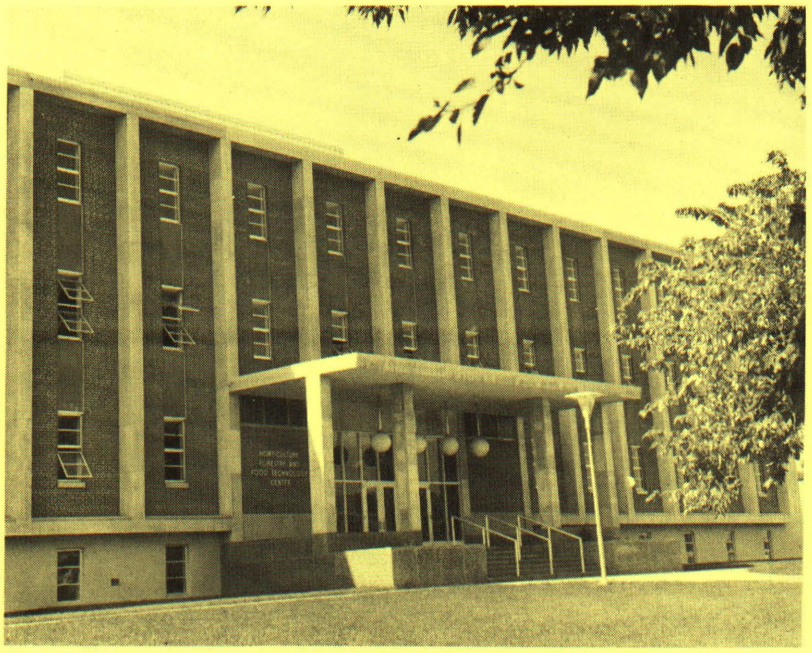

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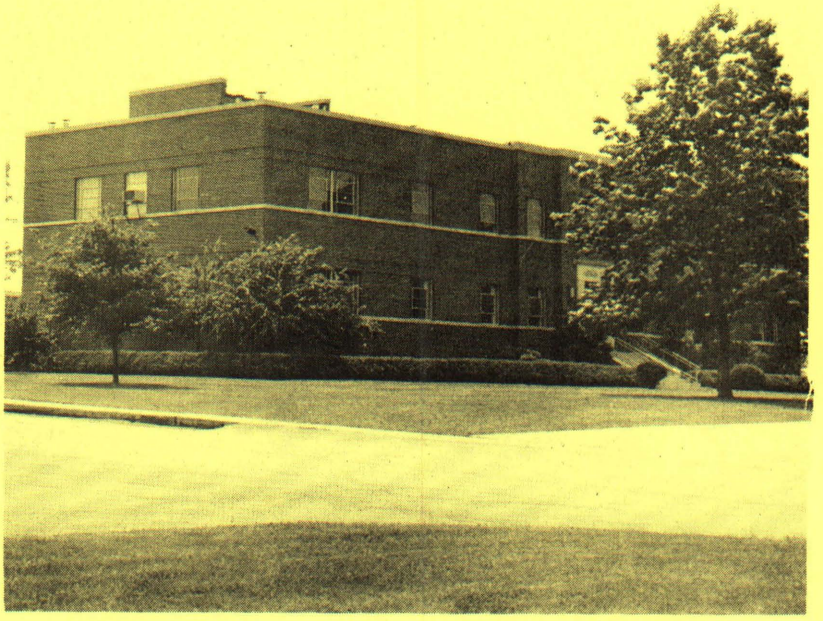
DEPARTMENT OF HORTICULTURE

The Ohio State University
and
Ohio Agricultural Research and Development Center



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-CONTENTS-

THE PROFESSION 1

HORTICULTURE IN OHIO 1

THE DEPARTMENT 2

RESEARCH PROGRAMS

- GENERAL 4
- FLORICULTURE 5
- FOOD TECHNOLOGY 8
- GREENHOUSE VEGETABLES 13
- NURSERY LANDSCAPE 15
- OUTDOOR FRESH MARKET VEGETABLES & POTATOES 19
- PROCESSING VEGETABLE CROPS 23
- TREE & SMALL FRUITS 26

APPENDIX

- DEPARTMENT FACULTY 31
- FACULTY TIME DISTRIBUTION 34
- FACULTY PUBLICATIONS 36
- FACULTY BIOGRAPHICAL BACKGROUND 38

PREFACE -

This publication is an attempt to summarize the current programs and activities of the Department of Horticulture at The Ohio State University and the Ohio Agricultural Research and Development Center. The department represents one of the larger and more complex organizations of its type in the country. An attempt is continually made to update and increase the revelancey of the programs to the needs of the horticultural industries of the state and to society.

DEPARTMENT OF HORTICULTURE

The Ohio State University
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HORTICULTURE-THE PROFESSION

Horticulture is one of the oldest professions known to man. It is a dynamic and expanding field encompassing the production, storage and utilization of fruits and vegetables for the everyday diet as well as the production and use of flowers, ornamental plants and trees to beautify, enrich, and preserve man's environment.

There is increasing national concern over environmental quality and natural beauty. There is likewise increased emphasis being directed toward the improvement of the nutritional standards of the people of the world and the increased use of quality fruit and vegetable products to supply these nutrients in the diet. Gardening, and horticulture in general, is also assuming increased importance as a leisure time recreational activity.

While there are expanding demands for horticultural goods and services, there are also increasing problems in satisfying these demands. Horticultural crop production is currently an intensive user of hand labor, yet there is projected to be a continuing decline in the availability of willing and qualified farm workers. To meet the challenge of the next quarter century, it is apparent that there must be continuing emphasis placed upon improving production efficiency as well as the quality of horticultural products offered the consumer. Horticulture must also play an even more active role in preserving the environment both through minimizing potential adverse effects of production practices and through the use of plants to enrich the environment. Horticulture can and does make a positive contribution to the quality of the environment and to its beauty.

HORTICULTURE IN OHIO

Ohio is a leading horticultural state. Because of its geographic location, climate, soils, and population density, Ohio has a wide diversity of horticultural industries. It ranks first among the states in greenhouse vegetable production, fourth in floral crop production, second in the production of processing tomatoes, eighth in apple production, third in nursery crop production, and fifth in fruit, vegetable, and food processing.

Farm Value of Horticultural Crops in Ohio

	1969 Thousand Dollars
Vegetables	65,297
Horticulture Specialties (Flowers and Ornamental Plants)	50,217
Fruits	16,844
Total	132,358

While the farm value of horticultural crops is significant, it represents only a small portion of the total impact of these horticultural industries upon the economy of the state. For example, the production segment of the vegetable industry provides the raw materials needed to support the vegetable processors of the state and makes possible their major contribution to the local and statewide economies. Raw materials represent only approximately 20% of the value of the processed product. The 1,100 producers of floral crops, provide the materials needed to support the 1,400 retail florist establishments of the state. The nurserymen provide the basis for garden centers, as well as, landscape design and maintenance firms.

It is important to note that a high proportion of the dollars generated through the final sale of various horticultural goods and services are expended for labor. These monies then circulate freely within local economies.

Horticulture is important in the state and shows every indication of becoming even more important in the future. The demand for college graduates with a broad training in horticulture is expected to increase rapidly over the next 20 years. The opportunities are nearly unlimited; the challenge is great.

THE DEPARTMENT

The Department of Horticulture at The Ohio State University and at the Ohio Agricultural Research and Development Center has long been recognized as one of the leading horticultural departments in the United States. The department began in January, 1881, merely as a "Committee of Horticulture and Botany" in the School of Agriculture. This first "Committee" was headed briefly by Mr. A.P. Morgan but soon became the responsibility of Professor William R. Lazenby. In 1891, Botany became a separate department and Horticulture, which was then joined with Forestry, was headed by Professor Lazenby, who continued in this position until 1908.

The Department of Horticulture has continued to grow and to expand its programs. In 1969, the Forestry segment of the total program was separated from Horticulture and attached to the new School of Natural Resources. There are presently 30 full time professional faculty assigned to the department; 20 are stationed in Columbus and 10 at the Ohio Agricultural Research and Development Center in Wooster. There is a close coordination of the two groups to insure a strong single cohesive unit.

The department is organized with a chairman based in Columbus. He is responsible for the direction of the coordinated research, extension, and resident instructional programs of the total department. Because of the varied and diverse responsibilities of the position, it is essential that the chairman concentrate his efforts on the administration of the department. In the fall of 1970, an Associate Chairman was appointed. He is stationed at Wooster and devotes more than 50% of his time to administration with emphasis on the OARDC based programs.

The physical facilities of the department are some of the best in the United States. The Columbus based staff are housed in the new Horticulture, Forestry and Food Technology Center, Howlett Hall. This facility is located on the West Campus and was completed in 1969. The facility comprises 62,500 square feet of space for staff offices, classrooms, laboratories, graduate student offices, and a modern pilot food processing facility. There are also two greenhouses of 21,300 square

feet of glass and a modern headhouse.

Excellent facilities also exist on the OARDC campus in Wooster. In Gourley Hall, completed in 1950, there is 19,000 square feet of office and laboratory space in addition to greenhouse space and headhouse facilities. The department is also assigned farm facilities at Wooster, Columbus, and at "Overlook", which is 25 miles south of Columbus. Fruit and vegetable research activities are also carried on at a number of the "branches" of OARDC on individual grower farms.

The basic philosophy of the department has been and still is to serve the people of Ohio through working with the various horticultural interests of the state and to help them reach their full potential. Teaching programs are designed to provide the type of training needed by students as they assume their varied roles within the industries of the state. Research emphasis is oriented toward solving those problems that may be limiting the full development of the various horticultural interests. Extension programs have been closely integrated with research efforts to insure that producers have the opportunity to quickly adopt new technology and remain in a strong competative position.

A recognized strength of the department is a strong plant product processing program as an integral part of the total departmental effort. This provides the opportunity to follow the production of a commodity from the seed to the consumer. The final evaluation of new production techniques and potentially superior cultivars must typically be evaluated in terms of the processed product. Conversely, new fruit and vegetable processing technology often provides new opportunities for adjustments in production technology. Without a strong program, the contributions of the total department would be materially weakened.

Times change and consequently departmental programs must change to insure that the resources available result in the greatest possible benefit. Recently provided improved facilities for the department has added new dimensions to the total effort. Programs can now be activated that were previously impossible.

It is recognized that the only real strength of a department lies in the strength of its faculty and staff. There exists among all personnel a strong cooperative spirit and dedication to the overall goals and objectives of the department. It is the faculty and their supporting staff that have projected the department to its present position of national prominence. This could not have been accomplished, however, without the support provided by the leadership of the College of Agriculture, the Ohio Agricultural Research and Development Center and the Cooperative Extension Service. With the young and dynamic spirit that currently exists within the faculty of the department, even greater heights of achievement are expected in the future.

RESEARCH PROGRAMS

The research programs of the department have over the years been continually modified and adjusted to reflect the changing needs and opportunities of the horticultural industries of the state. The programs have largely been mission oriented but with emphasis also directed toward the development of a clearer understanding of various horticultural principals.

In general, the research programs of the department may be divided into the following commodity areas, however, in many instances, specific research may be designed to provide information that would be useful in more than one commodity area.

1. Floriculture
2. Food Technology
3. Fresh Market Outdoor Vegetables Including Potatoes
4. Greenhouse Vegetables
5. Landscape Horticulture
6. Processing Vegetables
7. Tree and Small Fruits

On the following pages an attempt will be made to summarize the current programs underway in these areas as well as the anticipated future direction of the specific programs.

FLORICULTURE

The floriculture industry of Ohio is strong and viable. Ohio currently ranks fifth in the United States in the production of floral crops behind California, Florida, New York, and Pennsylvania. The industry is expected to continue to expand and in the relatively near future, surpass New York and Pennsylvania in production. Ohio has declined in the production of carnations because of the more favorable growing conditions that exist in California, Colorado and South America, and flowers grown in these areas can be economically shipped by air into Ohio markets. On the other hand, there has been an increase of about 25% in the production of cut chrysanthemums. The large size of the blooms make them costly to ship by air thus providing an advantage to local producers. The production of roses has doubled which has been largely stimulated by the development of the 'Forever Yours' rose which responds very favorably to Ohio growing conditions and to local market use.

The production of pot plants in Ohio has increased faster than the increasing population. Presently geraniums represent the number one pot plant in the state and there is never an adequate supply of pot mums, lilies, and poinsettias for special days. The production of bedding plants has increased very rapidly in Ohio and this trend is expected to continue.

A significant contributing factor to the current strength of the floriculture industry in Ohio is the strong and long standing research and extension programs of The Ohio State University and the Ohio Agricultural Research and Development Center. The Florist Short Course, held in Columbus annually, attracts a thousand florists, producers, wholesalers, and retailers from all over the United States.

The emphasis of the floriculture research program has been directed toward increasing the efficient use of available greenhouse space. Since it costs the operator about $3.50 for each square foot of greenhouse production space per year. It is essential that maximum production be obtained for each square foot of greenhouse space. Emphasis has also been placed on the timing of floral crops to attain the optimum stage development for peak market demand periods. Much of the research emphasis of the floriculture program has been mission-oriented with some stress placed on generating information concerning specific plant growth characteristics needed for further refinement in production systems. The following is a listing of current research projects designed to satisfy current and future needs of the industry with the Scientist Man Years (S.M.Y.) assigned to each.

HATCH 417: THE DETERMINATION OF MODES OF ACTION OF VARIOUS PLANT GROWTH REGULATORS ON FLORICULTURAL CROPS

Personnel: Staby (.35 S.M.Y.)

Objectives:

1. To test the effects of various plant growth regulators on the growth and development of certain floricultural crops.

2. To determine the mode(s) of action of various plant growth regulators.

This is a relatively new project developed to obtain a better understanding of the modes of action of various chemical growth regulators to facilitate the more effective and refined use of such chemicals in modifying plant growth responses. Such information is essential to the continued refinement of cultural systems.

NEW-K: EFFECT OF CHEMICAL GROWTH REGULATORS ON GROWTH, FLOWERING AND QUALITY OF FLORIST CROPS

Personnel: Kiplinger (.20 S.M.Y.)

Objectives:

1. To assess the efficiency of use by commercial florists of various growth regulators in the production of several floral crops.

This project will complement Hatch 417 in that compounds found effective in the regulation of various aspects of growth of floral crops will be evaluated for commercial application with respect to concentration, method and time of application, side effects, and general overall aspects on plant growth.

NEW-T: THE EFFECTS OF ECOLOGICAL FACTORS ON THE GROWTH, FLOWERING AND QUALITY OF GREENHOUSE FLORAL CROPS

Personnel: Tayama (.25 S.M.Y.)

Objectives:

1. To determine the effects of photoperiod and light intensity in increasing production and timing florist crops.

2. To compare the effects of various fertilizers on the growth and quality of florist crops.

3. To determine the effects of temperature in increasing production and timing of florist crops.

4. To determine the effects of various cultural techniques in increasing production and timing of florist crops.

This is a new project and will encompass all or portions of the work previously conducted under State 222, Factors Affecting Date of Flowering and Flower Bud Count of Several Lilium longiflorum Clones; State 354, Mineral Element Content of Aerial and Root Portions of Several Florists Crops; State 372, Flower Bud Initiation and Development of Several Floral Crop with Special Emphasis on the Effects of Light, Temperature, and Growth Regulators; and Hatch 327, Differential Effects of Ecological Factors Depending Upon Plant Age of Greenhouse Floral Crops.

Studies concerned with the effects of carbon dioxide, moisture, and soils will be scheduled at a later date.

HATCH 374: CONTROL OF TYPE OF VEGETATIVE AND REPRODUCTIVE GROWTH ON SELECTED FLORIST CROPS

Personnel: McDowell (.70 S.M.Y.)

Objectives:

1. To study the interrelations of light duration, intensity, temperature, and exogenous growth regulators as they effect:

   a. flowering of aphelandra and Poinsettia
   b. dormancy or growth inhibition in carnation and Easter lily

The total floriculture research effort is currently in the process of reorganization to place increased emphasis on those areas that offer the greatest need for increased research and where the greatest benefits can be realized in terms of present industry needs and future opportunities.

FOOD TECHNOLOGY

The fruit and vegetable processing industries represent a very significant segment of the total horticultural industries of Ohio. They add in excess of $1 billion annually to the value of the raw products produced on Ohio farms. This segment of the industry employs 85,000 men and women during the peak of the canning season and contributes significantly to the total economy of the state.

Tomatoes are the leading processed food in Ohio. Ohio is the No. 1 state in the manufacture of tomato juice, the official state beverage. Tomatoes in Ohio are processed as whole tomatoes, juice, ketsup, paste, sauce and tomato pulp.

Potatoes are another important Ohio processed food. Potatoes are processed as chips, french fries, or dried and manufactured into potato starch. Chips are the most important potato processed product in Ohio. With the rapid increase in the popularity of wine, Ohio is increasing in importance as a producer of quality table wines.

Other important Ohio processed food items are green and lima beans, cherries, corn, jams, jellies, juice drinks, peas, pickles, pumpkin, sauerkraut and many specialty gormet food items.

The food technology research emphasis of the department is as follows:

(a) processed various fruits and vegetables

1. to improve quality of processed products

2. to develop new processed products

3. to improve processing efficiency by developing new unit operations and refinements of existing unit operations

4. to expand food processing operations for new and greater outlets of Ohio fruits, vegetables, and related crop products

(b) development of new methods of quality assessments and evaluation of fresh and processed foods to enhance the acceptance of Ohio foods

(c) improvement of nutritional values of processed foods by selection of higher quality raw materials, new processing methods, fortification practices and shelf-life handling

(d) evaluation of production practices including evaluation of new varieties and cultivars for processed product quality improvement and efficiency

Food technology facilities within the Department of Horticulture at The Ohio State University are some of the best available in the United States. The program underway has an excellent reputation and there are unique opportunities to expand programs to more adequately capitalize upon the opportunities that exist to further strengthen the food processing industries of Ohio.

The following are the current active research programs underway and the Scientist Man Years (S.M.Y.) assigned to each:

NEW-G: FACTORS EFFECTING QUALITY IN MARKET ACCEPTABILITY OF CANNED TOMATOES AND TOMATO PRODUCTS

Personnel: Gould-Berry (.30 S.M.Y.)

Objectives:

1. To evaluate the effect of variety, maturity within a variety and harvesting, handling, and holding systems by variety on canned product quality and market acceptability of tomatoes.

2. To evaluate unit operations of washing, peeling, filling, and vacuumizing on canned tomatoes and on juice and concentrated tomato products manufacture as to effects on canned product quality and market acceptability.

3. To determine the effect of food additives (acidulants, sweeteners, firming agents, and spices) on quality and market acceptability for canned tomatoes, juice, and concentrated tomato products.

This is a new project encompassing activities previously carried on under Hatch 157-1 and Hatch 29 and is designed to keep the Ohio tomato processing industry informed as to needed changes and new technological opportunities resulting from new research findings and from changes that may be occuring within the raw product as a result of shifts in cultivars and production practices. This project is very closely interrelated with Hatch 349 and New-I.

NEW-F: RELATION OF PROCESSING TECHNIQUE AND CHEMICAL COMPOSITION TO THE QUALITY OF POTATO CHIPS

Personnel: Gould-Mosley (.30 S.M.Y.)

Objectives:

1. To determine effect of cultivar storage time and temperature in reconditioning periods on the quality of potato chips.

2. To develop and apply processing technology to produce new and improved potato products.

3. To study factors effecting shelf-life of potato chips.

4. To establish quality control procedures and parameters for raw and processed potato products.

This project replaces Hatch 122-3 and is designed to provide the needed information necessary to strengthen the potato chip industry of Ohio.

HATCH 157-2: INFLUENCE OF NEW FRUIT SELECTIONS AND CULTIVARS ON PROCESSED PRODUCT QUALITY

Personnel: Gallander (.40 S.M.Y.)

Objectives:

1. To ascertain the suitability of promising new fruit cultivars and selections for processing as indicated by the quality of the finished product.

2. To obtain experimental data upon which to base recommendations to Ohio growers, processors and consummers as to those cultivars most suitable for processing.

3. To determine the influence of various processing techniques and cultural practices on the quality of the finished products.

This project has recently been revised and is closely related to the fruit crops research program specifically New-A and New-B.

HATCH 425: DEVELOPMENT AND REFINEMENT OF TECHNIQUES FOR DISPOSAL OF WASTE FROM FRUIT AND VEGETABLE PROCESSING PLANTS

Personnel: Geisman (.30 S.M.Y.)

Objectives:

1. To evaluate methods for disposing or reducing saleine wastes from food processing operations.

2. To develop techniques for utilizing or reducing solid waste from food processing plants.

3. To determine whether pesticide residues, if present, can be reduced in or removed from food processing wastes.

This is a relatively new project and designed to provide answers to one of the more critical problems confronting the fruit and vegetable processors of the state that being the potential for environmental contamination from waste.

HATCH 378: RADIOCHEMICAL DETERMINATION OF HERBICIDES IN VEGETABLE CROPS BEFORE, DURING, AND AFTER PROCESSING

Personnel: Geisman (.20 S.M.Y.)

Objectives:

1. To develop and refine activation analysis techniques for tracing herbicides and their metabolites in plants used for food.

2. To define and establish the sources of chemical and biological variations of samples asseyed.

3. To study some of the changes in pesticide chemicals which occur during the unit operations in processing.

This project represents an on-going program to further insure the quality and wholesomeness of processed products.

HATCH 341: CONCENTRATION OF GRAPE JUICE, OTHER JUICE PRODUCTS, AND MAPLE SYRUP BY REVERSE OSMOSIS

Personnel: Gallander (.25 S.M.Y.)

Objectives:

1. To determine the feasibility of concentrating grape juice and other juices by reverse osmosis.

2. To determine the reduction ratio and flux rate of various chemical constituents and evaluate engineering perimeters of the process as effecting product quality.

This project has recently been revised and efforts intensified to capitalize on some of the opportunities that exist through the refinement of the reverse osmosis technique.

HATCH 441: IMPROVING THE QUALITY OF OHIO VARIETAL TABLE WINE BY THE INDUCTION OF MALO-LACTIC FERMENTATION

Personnel: Gallander (.35 S.M.Y.)

Objectives:

1. Investigate the effects of various vinification procedures on the induction of malo-lactic fermentation.

2. To determine the effect of M-L fermentation on product quality.

3. To ascertain the occurance of M-L fermentation in commercial wines.

This is a new project designed to provide information needed by wineries to insure the continued and improved quality of table wines.

HATCH 411: THE EFFECT OF BIOCHEMICAL COMPONENTS OF HORTICULTURAL CROPS ON THE QUALITY OF THE PROCESSED PRODUCT

Personnel: Crean (.50 S.M.Y.)

Objectives:

1. To evaluate the role of polysaccharide and polyuronide materials and their specific enzymes in determining textule characteristics of horticultural crops.

2. To evaluate the effect of polyphenolic compounds on the quality of processed horticultural crops.

This is a relatively new project designed to provide the necessary background information to insure quality products of high nutritional value.

HATCH 396: LIPID CHANGES AS RELATING TO KEEPING QUALITY OF PROCESSED HORTICULTURAL FOODS

Personnel: Peng (.50 S.M.Y.)

Objectives:

1. To investigate the quantitative distribution of lipid classes and their fatty acid composition present in cabbage, cucumber, grape, potato and tomato.

2. To study the changes in lipid composition of the above horticultural foods during processing.

3. To further study the variation of lipid content and composition of processed products with different cultivars and storage conditions.

This project is relatively new and designed to provide data needed to further enhance the nutritional value and product quality of horticultural commodities.

GREENHOUSE VEGETABLE CROPS

Ohio is the largest producer of greenhouse vegetable crops in the United States with over 600 acres under cultivation. One-third of the total U.S. acreage is in Ohio and the crop has an annual value of $15 million. The Ohio greenhouse vegetable acreage is relatively stable at the present, however, with increased competition from imports from Mexico, the greenhouse vegetable industry, as well as, the winter fresh market industry in the U.S. faces major problems.

It is expected that the Ohio greenhouse vegetable industry will remain strong and viable. A high degree of advanced technical production know-how currently exists within the industry. The Ohio industry also possesses a strong and well organized marketing system and is under the guidance of progressive and well informed leadership. In the past, aggressive research programs and the rapid adoption of new techniques have been important factors in the growth and stability of the industry. It is apparent that continued advanced visionary research is needed if Ohio greenhouse vegetable growers are to remain in a strong competitive position. The industry can compete with imports only if it continues to produce a high quality product for the affluent people who are educated to, and will pay for, quality in tomatoes as well as other greenhouse vegetables.

Research programs within the Department of Horticulture to serve the needs of the greenhouse vegetable industry fall into two major areas: (1) the development of new production systems to further increase production efficiency, (2) the refinement of greenhouse vegetable cultivars to insure high yields of quality produce under Ohio conditions. The total program has undergone considerable revision over the past two years and is currently under the direction of new personnel within the department.

The following projects presently encompass the greenhouse vegetable research efforts of the department:

NEW-J: DEVELOPMENT OF REFINED GREENHOUSE TOMATO PRODUCTION SYSTEMS

Personnel: Bauerle (1.00 S.M.Y.)

Objectives:

1. To determine the influence of plant density cropping systems on plant growth, yield and quality of the greenhouse tomato and to develop cultural technology for mechanization of planting, pollination and harvesting of tomatoes.

2. To determine the influence of growth regulators on fruit set, plant and fruit development, fruit ripening and fruit quality.

3. To determine the influence of methods of pollination on yields and quality attributes of the greenhouse tomato.

4. To ascertain the interrelationship of environmental factors such as light, temperature, ambient CO_2, relative humidity, soils, mineral nutrition, etc. on yield and quality of the greenhouse tomato.

This is a new project involving those cultural studies relating to greenhouse

tomato production. This project replaces project H-213.

NEW-K: GENETICS AND BREEDING OF GREENHOUSE VEGETABLE CROPS

Personnel: George-Farley* (.51 S.M.Y.)

Objectives:

1. Development of tomato cultivars adapted to greenhouse culture with:
   a. improved fruit quality, increased yield and larger fruit size
   b. multiple resistance to greenhouse diseases
   c. tolerance or resistance to greenhouse insect pests
   d. tolerance to air pollutants

2. Reduce production costs by breeding for increased pollination efficiency and a non-suckering vegetative growth habit.

3. Reduce harvesting costs by genetically retaining the calyx on the fruit and removing or shortening the pedicel.

4. Evaluation of lettuce and cucumber cultivars adapted to greenhouse cultural conditions.

This is a new project and is a joint effort between the Departments of Horticulture and Plant Pathology with cooperation from the Department of Entomology. It combines the essentially independent programs previously carried on within the two departments. This project replaces State 80. It is believed that through the closely coordinated and combined efforts of professional workers from varied disciplines, maximum results from available resources will be realized.

* Dr. Farley is of the Department of Plant Pathology. The S.M.Y. committment refers only to the Horticulture involvement in this project.

A project, in addition to the two listed above, is planned to initiate research relating to the development of refined cultural systems for greenhouse vegetable crops other than tomatoes.

NURSERY-LANDSCAPE

Ohio ranks third in the United States in the production of nursery stock and it is projected that this segment of Ohio's horticultural industries has the strong potential to continue to expand. There is increasing emphasis being placed upon natural beauty and the quality of the environment. People are placing greater importance upon home landscaping and outdoor living areas. As people have more leisure time, many turn to the development of the home grounds as a leisure time recreational activity. The importance of parks, green areas within inner cities, and roofgardens, not to mention the increased indoor use of plants are also receiving increased recognition. All of these and other considerations point toward greater expanded opportunities for the production and utilization of ornamental plants.

It is significant that the wholesale value of nursery stock produced in Ohio is a very poor indicator of the total impact of this industry upon the state's economy. The goods and services segment of this total industry is significant and is expanding rapidly. In the future it is expected that there will be a further expansion of landscape design firms, garden centers, landscape maintenance companies, etc. as the use of plants in public and private areas increases.

There are changes taking place within the industry. Presently, 1/3 of all the nursery stock grown in Ohio is produced in Lake County. Urbanization is forcing relocation of some of the establishments to less densely populated areas. This same situation is also occuring in some other sections of the state. Production acreage has not decreased and marketing outlets continue to increase. Labor is a continuing problem because of the higher wage rates demanded and the seasonality of the business. More effort must be directed toward minimizing the labor requirement within the nursery industry if quality plants are to continue to be available to the consuming public at realistic yet profitable prices. This has been responsible for a trend toward the greater production of container grown stock and while opportunities exist in this area, innovative research is needed in techniques of overwintering these plants. It is also important to indicate that many more container plants can be produced on a given area and productive field soils are not essential.

The production of nursery stock in Ohio has long been dependent on the length of the growing season. Increasing production costs dictate the need for greater dollar return per unit area in a shorter period of time. The feasibility of producing high quality woody plants for market more rapidly by using plastic structures has been explored and appears to have great potential in a production and marketing program. For example, it would be possible to reduce production time by 1/3 to 1/2 and also provide certain plants for forcing and sale on holidays during the winter months.

As the use of plant materials increases in smaller and more confined areas, there are needs and opportunities to tailor plants for specific uses within the landscape. Size, shape, form, and growth characteristics are all important. Through natural selection, breeding and chemical plant growth regulation, unique opportunities exist. More carefully organized programs for the evaluation of trees and other ornamental plants for specific uses in many urban landscape situations is also needed along with additional information relating to the nutrition of and weed control in ornamental plantings.

It is recognized that the research emphasis of the department is inadequate to satisfy all of the needs and opportunities in this area and that additional research

effort is needed. The following is a listing of current research projects with the Scientist Man Years (S.M.Y.) assigned to each.

HATCH 330: ROOTING PHYSIOLOGY OF CUTTINGS IN HORTICULTURAL PLANTS

Personnel: Kawase (.70 S.M.Y.)

Objectives:

1. To study why application of centrifugal force, ethylene, and etiolation stimulates the rooting of cuttings including extraction and identification of difussable rooting substances and to investigate ways to apply these techniques and new findings in practical cutting production.

This project has just been recently revised and is to provide additional information on improving the efficiency of rooting various types of ornamental plants.

HATCH 352: GROWTH OF ORNAMENTAL PLANTS AS INFLUENCED BY LIGHT, TEMPERATURE, AND GROWTH REGULATORS

Personnel: Kozel (.40 S.M.Y.)

Objectives:

1. To determine amounts and types of endogenous growth regulators in ornamental plants and to determine effect of exogenously supplied growth regulators, temperature and light on endogenous growth regulators and plant growth to determine the commercial applications of various growth regulating substances.

This work is designed to utilize various factors in manipulating plant growth to better tailor plants to today's needs.

STATE 200: HARDINESS, ADAPTABILITY, AND IDENTIFICATION OF SPECIES, VARIETIES AND CLONES OF SOME WOODY ORNAMENTAL PLANTS

Personnel: Reisch-Kawase (.30 S.M.Y.)

Objectives:

1. Determine the hardiness and adaptability of various ornamental plants under Ohio conditions.

2. Develop a living herbarium of Flowering Crabapples and Taxus and to prepare a key of identification for Taxus and other genera based upon vegetative characteristics.

3. Determine the hardiness, adaptability and bloom production of as many kinds of roses as possible of modern and older gardens.

This project is to be revised soon and updated in terms of current needs.

STATE 308: CONTENT AND FRACTIONS OF MINERAL ELEMENTS IN AERAL AND ROOT PORTIONS OF SEVERAL WOODY ORNAMENTAL PLANTS

Personnel: Reisch-Kozel-Smith (.15 S.M.Y.)

Objectives:

1. To determine the mineral element content of different vegetative parts of several woody ornamental plant species.

2. To determine the critical or optimum range of certain essential mineral elements for several woody ornamental plant species.

3. To investigate nutritional disorders in selected plant species in which deficiencies of trace elements or fractions thereof are known or believed to be the cause of visual deficiency symptoms.

This project is to be revised in the near future.

STATE SPECIAL 148: CHARACTERISTICS AND ADAPTATIONS OF SPECIES AND CULTIVARS OF SHADE AND ORNAMENTAL TREES WITH EMPHASIS ON STREET AND HIGHWAY LANDSCAPE USE

Personnel: Reisch-Kozel-Kawase (.20 S.M.Y.)

Objectives:

1. To evaluate under similar environmental and cultural conditions, relative attributes and faults of selected ornamental and shade tree species and cultivars suited for street, highway and municipal area planting.

2. To determine specific characteristics of these trees such as hardiness, insect and disease resistance, growth rate and growth habit.

3. To devise lists of tree cultivars for specific landscape use.

4. To aid in reducing the time until selected trees "to fit the need" are available for widespread use.

5. To evaluate varieties and cultivars through survey of existing street plantings.

6. To determine effect of ecological variations on performance of selected cultivars and species.

This is an on-going project in part supported by 8 Ohio Electric Companies, Ohio Chapter, International Shade Tree Conference, and the Ohio Nurserymen's Association and is designed to provide information needed to improve the overall use of shade trees in urban areas with particular reference to street plantings. This work will be continued and expanded in the years to come.

NEW-R: ACCELERATING PLANT PRODUCTION AND IMPROVING MARKETABILITY OF OVERWINTERED CONTAINER-GROWN NURSERY PLANTS BY USE OF HEATED PLASTIC STRUCTURES

Personnel: Reisch-Smith-Buscher (.10 S.M.Y.)

Objectives:

1. Produce marketable, high quality, woody landscape plants in a shorter period of time, using heated plastic structures.

2. Develop cultural practices (pruning, nutrition, chemical growth regulation, irrigation) to provide maximum quality in the finished plant.

3. Study effects of this practice on aspects of plant growth with emphasis on the root system, foliage, stem elongation, and flower bud development.

4. Compile data on construction and maintenance costs, light quality and intensity, economy of heating, and other aspects related to the use of the structures.

5. Evaluate this type of structure for year-round use and as a mean for maximum winter protection of container-grown nursery stock.

6. Study effects of light intensity, temperature, fluctuation, condensation, and anti-dessicants on the quality of container-grown stock as related to marketability.

This is to be a new project and is currently being developed. It will essentially replace Hatch 290. The work is designed to place much greater emphasis on the development of improved systems of providing optimum efficiency in enhancing the growth of plants and the over-wintering of container grown nursery stock. This new project will be submitted for consideration in the immediate future.

In addition to the above projects, Hatch 71-2, Chemical and Cultural Weed Control Studies With Horticultural Crops contributes significantly to the total research effort within the landscape-ornamental horticulture area with a portion of this project devoted to weed control techniques in commercial nurseries.

OUTDOOR FRESH MARKET VEGETABLES INCLUDING POTATOES

Ohio is uniquely suited to the commercial production of many different vegetable crops. There exists a wide range of climate, and soils vary from sandy to muck. Producers are located in close proximity to major markets making several marketing procedures and opportunities possible. There are over 40 different vegetables grown commercially in Ohio.

In many states, the vegetable industry is concentrated in limited areas and only a few crops may be involved. Yet in Ohio the reverse is the situation. The climate in southern Ohio is similar to that in North Carolina and Tennessee, whereas the climate in northeastern Ohio is similar to New York and other northeastern states. While the varied climate and soils provide unique opportunities for the production of many different vegetable crops, it also results in the need for research with numerous vegetable crops to satisfy the need for advanced technological information.

Potatoes are second only to processing tomatoes in commercial vegetable production in Ohio. While potatoes are sold fresh, many are sold to "chippers" for processing into potato chips. Presently, 40% to 50% of Ohio's annual production is estimated to be used for potato chips.

The fresh market vegetable producers are not without problems. There is a critical need to increase production efficiency with primary emphasis placed on increasing labor efficiency through the development of new and imaginative cultural systems. There is also need to produce crops of ever increasing quality and to develop systems of handling and marketing to insure that the product reaches the consumer at the optimum stage of maturity. New cultivars are being introduced each year. If Ohio producers are to satisfactorily compete with producers from other areas, it is essential that there be available to them up-to-date information relative to the specific attributes of the new cultivars as well as their specific adaptation to Ohio growing conditions.

Presently there is considerable research emphasis being placed upon both varietal evaluation and new intensive systems of culture for potatoes. This is being done because of the major importance of this crop and the need to do everything possible to strengthen the competitive position of the potato industry.

For many years Ohio was looked upon as having one of the best overall varietal evaluation programs in the country. Upon the closing of the Marietta Branch and the death of Dr. Walter Brown, this program was greatly reduced. Presently, there is a critical need for vegetable cultivar information and with the addition of new personnel this program is being strengthened. Additional cultural studies are needed and will be developed as the total program emerges.

The following is a listing of those projects directly related to outdoor fresh market vegetables including potatoes with the Scientist Man Year (S.M.Y.) assignment to each:

STATE 415: EFFECT OF PLANTING AND HARVEST DATE AND SPACING OF POTATO SEED PIECES ON YIELD, QUALITY AND MATURITY OF POTATOES FOR CHIP PROCESSING

Personnel: Mosley-Gould (.30 S.M.Y.)

Objectives:

1. Determine the effect of planting and harvest date and the spacing of potato seed pieces on:

   a. sprout emergence and number of stems produced per seed piece
   b. time of tuber set and number and size of tubers produced per hill
   c. total yield grade and quality of the processed product

2. Determine the effect of harvest date and length of growing season on the yield, grade and quality of the processed product.

3. Determine when the potato is at optimum maturity and quality for chip processing and what effect the imposed variables have on this maturity.

This project was initiated to develop techniques to further increase potato production efficiency. Since many potatoes produced in the state are chipped, it is considered essential that any change in cultural systems be finally evaluated in terms of potential effects upon the ultimate processed product, before such a practice is recommended for grower use.

STATE 420: DETERMINATION OF POTENTIAL VALUE OF NEW POTATO LINES AND CULTIVARS

Personnel: Mosley (.30 S.M.Y.)

Objectives:

1. To determine the adaptability of pre-released breeder lines and newly released potato cultivars under the environmental conditions and cultural practices in Ohio.

2. To appraise the characteristics of tubers produced by these new lines and cultivars with respect to their usefulness for the fresh and processing markets.

This is an on-going program and includes that work that is associated with the north central regional potato trials. It also involves evaluation of new cultivars on a number of different commercial potato farms. This work is in part supported by the Ohio Potato Growers Association.

NEW-M: EVALUATION OF CULTIVARS AND SELECTED FRESH MARKET VEGETABLES INCLUDING SWEET CORN, TOMATOES, PEPPERS, CELERY, AND LETTUCE

Personnel: Alban-Mosley-White-George (.35 S.M.Y.)

Objectives:

1. To evaluate and compare the relative merits of promising new cultivars and advanced selections of several fresh market vegetable crops including sweet corn, tomatoes, peppers, lettuce, and celery to cultivars commonly grown in the state with regard to:

a. yield and quality
b. earliness of maturity
c. shelf-life and keeping quality

2. To compile experimental evidence upon which to base varietal recommendations to Ohio growers.

3. To compare methods of varietal evaluation (where applicable) in order to determine and select those procedures showing greatest efficiency and reliability.

This is a new project and replaces State 206-1 and State 206-3. It is intended that this would encompass all of the vegetable varietal evaluation work carried on within the department with the exception of potatoes and processing tomatoes. The potato cultivar evaluation program is of such in nature and magnitude that it is covered under an individual project as listed above. The processing tomato varietal evaluation program (State 206-4) is such an integral part of the overall processing tomato breeding program that is is to be included in project Hatch 349.

This project does involve to varying degrees imputs from a number of researchers. Several extension personnel are actively involved in this program since it is considered that such involvement would provide them the opportunity of developing a better "feel" for the potential of new cultivars and that this would provide first hand information to strengthen extension recommendation programs.

In the overall revision of this effort attempts have been made to reduce the amount of effort with an individual vegetable crop to merely the generation of that data that would be specifically useful to the producer in making cultivar decisions. In this way available resources can be used to evaluate cultivars of a larger number of vegetable crops.

NEW-W: DEVELOPMENT AND REFINEMENT OF CULTURAL AND CHEMICAL WEED CONTROL TECHNIQUES IN HORTICULTURAL CROPS

Personnel: Alban (.25 S.M.Y.)

Objectives:

1. To determine the most effective and economical chemical and cultural weed control programs for the major fruit, vegetable and ornamental crops.

2. To determine the possible effects of continuous use of herbicides on crop yields and quality, changes in major weed species, and on subsequent planted crops or green manure or cover crop.

3. To determine through laboratory, greenhouse, and field studies, more basic information on the interrelationship between crop and weed species, climatic factors, soil type, and specific cultural or chemical weed control methods.

4. To determine programs of crop rotation and herbicide usage which will result in maximum weed control with minimum hazards of chemical residues.

This is a new project that replaces Hatch 71-2. Work in this area represents a major effort within the department and while much of the effort is involved with vegetable crops, very significant phases of the program also relate to weed control in fruit crops and in nurseries.

PROCESSING VEGETABLE CROPS

The production of processing vegetable crops is a major horticultural industry within the state of Ohio. Ohio ranks second, only to California, in acreage and value of tomatoes grown for processing. In 1971, Ohio farmers grew 26,100 acres of processing tomatoes with an on-farm value estimated at over $22 million. This accounts for nearly 1/3 of the total annual cash value for all vegetables grown in the state. There has also been a sharp increase in the production of cucumbers for pickling in Ohio within recent years. It is projected that this trend will continue.

Prior to 1965 all of Ohio's processing tomatoes were picked by hand. Grower trials with mechanical harvesters started in that year and by 1971, 47 machines harvested 2,600 acres of tomatoes. It is estamated that 30% to 40% of the total tomato acreage will be harvested mechanically by 1975 and approximately 70% by 1980. This increase in mechanical harvesting is due primarily to the rising cost of hand harvesting and grower frustrations with attaining, supervising, and meeting government regulations for hand laborers.

If the Ohio canning tomato industry is to remain strong and to continue to expand, it is essential that new technological advances be made and adopted to facilitate the increase efficiency in production, particularly with respect to mechanization. This does involve the development of improved cultivars and the refinement in cultural systems. Much of the research underway in this area is to facilitate increased mechanization and the necessary horticultural practices that may be required.

An important part of the total research effort is that of basing results on the final processed product. Consequently, there is a very close interrelationship between the field phases of the processing vegetable research and the processing segment of the total program. Current departmental strengths lie in the fact that the facilities and technical know-how exist within the department to carry the program from the field through to the final product.

The following are those projects currently active within the department to serve the needs of the processing vegetable interests of Ohio:

HATCH 349: DEVELOPMENT OF IMPROVED VARIETIES AND STRAINS OF PROCESSING TOMATOES FOR MECHANICAL HARVEST

Personnel: Berry (1.00 S.M.Y.)

Objectives:

1. To develop mechanical harvestable tomato varieties of early to mid-season maturity for the mid-west with productivity, concentration of set, resistance to cracking, capacity to hold on the vine, quality, I and Ve resistance j1 or 2, cold and/or heat tolerance.

This is a major on-going effort within the department and vital to the continued development of the tomato processing industry of the state. Several promising lines are currently in the final stages of development. This project is soon to be revised to include the evaluation of promising tomato cultivars for processing cur-

rently included under project State 206-4.

NEW-I: CULTURE AND PHYSIOLOGY OF TOMATOES FOR PROCESSING

Personnel: Kretchman-Short-Gould-White (.40 S.M.Y.)

Objectives:

1. To establish optimum population density in plant arrangement for maximum yields of high quality fruit for once-over mechanical harvest from transplanted and direct seeded plantings on fine and course textured soils.

2. To determine the relationships of plant nutrition, fertilizer placement, soil type, vine training, weed control and plant population of transplanted and direct seeded tomatoes to plant growth, maturity, yield and fruit quality for once-over mechanical harvest.

3. To determine the influence of physical and physiological seed characteristics and environmental factors on vigor, uniformity, and stand establishment of direct seeded tomatoes.

4. To determine the influence of seeding density of southern grown transplants on subsequent yield, maturity, and fruit quality in Ohio.

5. To determine the influence of planting schedule and growth regulators on earliness, yield, and fruit quality for once-over mechanical harvest.

This is a new project to encompass the cultural studies necessary to refine those cultural systems needed in relation to new cultivars being developed and to facilitate increased mechanization. The work is done in cooperation with the Department of Agricultural Engineering and it is considered essential that there be a close interrelationship between the two departments in such areas of activity. This project replaces Hatch 361, Influence of Seeding Rate in Georgia and Subsequent Field Spacing of Tomato Transplants in Ohio Earliness, Yield and Quality of Processing Tomatoes.

NEW-X: CULTURE AND PHYSIOLOGY OF CUCUMBERS FOR PICKLING

Personnel: Kretchman-Short-Geisman-White (.40 S.M.Y.)

Objectives:

1. To determine optimum nutritional, plant spacing, density and cultivar relationships for maximum yields for once-over and multiple pick mechanical harvest.

2. To determine the factors associated with planting schedules, plant emergence, seed viability, growth rate, growth regulators and harvest maturity for maximum yields and returns for once-over mechanical harvest.

3. To determine the influence of cultural practices, mechanical harvesting, and post-harvest handling on processing quality of fresh pack and brine stock cucumbers.

This is a new project that is designed to satisfy the need for cultural information relating to the mechanization of pickling cucumber production. Work is to be carried on in close cooperation with the Department of Agricultural Engineering.

In addition to the above projects, the following two projects are very closely related to the total effort. Hatch 71-2, Chemical and Cultural Weed Control Studies with Horticultural Crops, and Hatch 157-1, Factors Effecting the Quality and Market Acceptability of Canned Tomatoes and Tomato Products. The latter of these two projects is essential to determine the acceptability of cultivars and field cultural techniques in terms of quality of the final processed product.

TREE AND SMALL FRUITS

THE INDUSTRY

Ohio is well suited to the production of a number of different tree and small fruit crops. Although there are a number of highly specialized fruit farms, most producers raise a wide range of fruit crops which can be marketed locally. There appears to be, at present, a regeneration of interest within the fruit industry of the state. One of the principle advantages Ohio fruit producers have is their close proximity to major markets.

Ohio growers typically produce between 3 and 4 million bushels of apples annually. The industry is characterized by "smaller" producers widely distributed over the state. This creates problems in terms of satisfying the demands of large volume buyers because of the inability of many producers to offer sufficient volumes of one variety, of one size and grade and in a specified package. The distribution of the industry and the concentration of population does, however, offer unique opportunities for local market, retail farm sales, and pick-your-own operations to supplement wholesale sales.

It is projected that there are opportunities for the increased production of apples for the wholesale markets providing imaginative and cooperative marketing efforts are further developed and providing there are increased efforts to produce higher proportions of top quality fruit. It is also projected that there are opportunities to increase the profitable production of apples for "pick-your-own" and for retail farm sales providing new concepts of efficient production of quality fruit are developed and adopted.

Ohio orchardists normally produce 1/2 million bushels of peaches. There are markets within the state that will insure Ohio growers a good profit for many more peaches than are currently produced. One of, if not the major, problems confronting Ohio peach producers is tree and blossom bud damage from low temperature extremes. The future potential of the peach industry in the state will likely be dependent upon the success that is attained in minimizing the losses experienced from low temperature damage.

Small fruits, particularly strawberries, offer opportunities for increased production in the state. The major opportunities exist in pick-your-own operations as well as retail farm sales.

The production of grapes for wine as well as fresh consumption offers a real potential for growth and expansion throughout Ohio. The climate is generally suitable, production know-how exists and there are well established research and educational programs underway. Additional refinements in production techniques are needed with particular emphasis on increasing labor efficiency. More information is also needed as to the most desirable cultivars to produce under Ohio conditions. There are also opportunities to expand the production of sweet and tart cherries, pears and plums.

RESEARCH PROGRAMS

Research programs in the fruit crop area have been modified rather significantly within the past year. The major emphasis has been directed toward (1) the

development of intensive systems of tree fruit culture to minimize labor requirements, improve product quality, and increase per unit profits, (2) mineral nutrition of deciduous tree fruits to insure maximum fruit quality and productivity, (3) grape production refinement techniques and studies relating to the utilization of grapes, (4) overall fruit cultivar evaluation for Ohio conditions, (5) pear breeding in cooperation with the U.S.D.A., and (6) herbicide studies.

Work with apple breeding, chemical fruit thinning, and the storage of tree fruits has been greatly reduced in order to increase emphasis in areas where increased research is needed. These are also areas where much information can be obtained from active programs in nearby states. Major extension efforts in the dissemination of chemical thinning and fruit storage information is planned to capitalize on that information already available. It is recognized that there are additional problems and opportunities not encompassed in current research efforts. Additional research needs would include increased emphasis on techniques to minimize low temperature in stone fruit losses, studies to minimize the adverse influences of pesticides and combinations of pesticides to fruit finish and carbohydrate synthesis, and total environmental control studies.

There exists excellent cooperation with the Departments of Plant Pathology, Entomology, Agronomy, Agricultural Economics, and Agricultural Engineering. This cooperation and continued coordination is essential if the industry is to receive maximum benefits from resources expended. The following are those horticulture projects currently active with the S.M.Y. (Scientist Man Year) assignment to each:

HATCH 421: DEVELOPMENT AND EVALUATION OF INTENSIVE APPLE PRODUCTION SYSTEMS

Personnel: Ferree-Rollins (.90 S.M.Y.)

Objectives:

1. To study management systems for high density orchards.

2. To study the effect of cultural practices on early growth of dwarf apple trees.

3. To study techniques of minimizing pruning labor and their effect on tree and fruit quality.

4. To study techniques to reduce costs of orchard establishment.

5. To study the relation of rootstocks to cultivar performance.

This is a new recently approved project designed to satisfy some of the informational needs and opportunities resulting from changing concepts within the fruit industry. This area of work will represent a major effort within the total fruit research program and is an area of research requested by the leadership of the Ohio Horticultural Society.

NEW-C: ROOTSTOCKS AND MANAGEMENT SYSTEMS FOR HIGH DENSITY STONE FRUIT PLANTINGS

Personnel: Hartman-Hill (.20 S.M.Y.)

Objectives:

1. To develop and evaluate the efficiencies of various management systems for high density plantings.

2. To evaluate planting distances and their relationship to growth, yield, cultural practices and labor requirements.

3. To evaluate the potential of available rootstocks for use in high density plantings.

4. To develop techniques for efficient asexual multiplication of such rootstocks.

This is a project currently under development to add increased research emphasis to the potentials of high density stone fruit plantings. It will also include work designed to minimize low temperature injuries to stone fruit plantings. This project will encompass current work with plum rootstocks and will replace project State 290.

HATCH 442: INFLUENCE OF CLIMATE AND SELECTED CULTURAL PRACTICES ON GROWTH, PRODUCTION, AND QUALITY OF GRAPES

Personnel: Cahoon (.35 S.M.Y.)

Objectives:

1. To determine the effect of selective rootstocks on grape cultivar performance.

2. To determine the potential for Ohio of promising new selections and in cultivars.

3. To determine improved production efficiency through the use of mechanical aides and chemical growth regulators.

This is a new project to add increased emphasis to the development of refined cultural techniques for grape production in Ohio and will represent a major effort within the fruit research program. This project replaces Hatch 40-1.

HATCH 69: MINERAL NUTRITION OF DECIDUOUS TREE FRUITS

Personnel: Cahoon-Ferree (.44 S.M.Y.)

Objectives:

1. To ascertain the affect of differential rates and combinations of nitrogen, phosphorus and potassium fertilizers on the growth, chemical composition, productivity, harvest maturity, and subsequent storage life of apples and peaches.

2. To determine the cause or causes of a nutritional condition known as internal bark necrosis or "apple measles" and to derive means of alleviating the problem in commercial Red Delicious orchards in Ohio.

3. To attempt to further refine the nutritional requirements of deciduous tree fruits with respect to both macro and micro nutrient elements by means of foliar analysis; to relate these foliar levels to changes in growth, yield, quality, harvest maturity and subsequent storage life of the fresh product.

This project is currently under revision. Emphasis will continue to be placed on the influences of nutrition on overall fruit quality particularly with respect to physiological disorders and fruit condition.

NEW-A: EVALUATION OF SELECTED TREE AND SMALL FRUIT SELECTIONS AND CULTIVARS FOR OHIO

Personnel: Hill-Ferree-Rollins (.14 S.M.Y.)

Objectives:

1. To ascertain the relative merits in comparison with accepted commercial cultivars of promising selections and new cultivars of tree and small fruits.

2. To obtain experimental evidence upon which to base varietal recommendations for the fruit growers of Ohio.

3. To develop and compare methods of varietal evaluation in order to determine those that are most expedient, reliable, and efficient.

4. To supply fruits of those cultivars and selections which exhibit superior growth and yield characteristics for the determination of possible value of these fruits for processing.

This project encompases work previously carried on under several projects; State 47, State 108, and State 254. It is designed to satisfy cultivar evaluation needs for many of the tree and small fruit crops produced in Ohio.

NEW-B: EVALUATION OF PROMISING PEAR SELECTIONS AND CULTIVARS FOR OHIO CONDITIONS

Personnel: Rollins-Oitto (.05 S.M.Y.)

Objectives:

1. To determine the performance of promising pear cultivars and selections under Ohio growing conditions.

2. To determine the especially promising pear selections and cultivars on various size controlling rootstocks.

This project is designed to supplement the intensive efforts of the USDA at the Ohio Agricultural Research and Development Center to develop new improved fireblight resistant pear cultivars. While this project does not represent a major effort of the fruit research program, pears do offer considerable potential for production in Ohio.

RELATED PROJECTS

In addition to the above projects, Hatch 71-2, Chemical and Cultural Weed Control Studies with Horticultural Crops and Hatch 157-2, Influence of New Fruit Selections and Cultivars on Processed Product Quality, and Hatch 441, Improving the Quality of Ohio Varietal Table Wines by the Induction of Male-Lactic Fermentation, all relate to the total research effort supporting the fruit industry of Ohio.

Faculty, Department of Horticulture, OSU and OARDC. First row: E. C. Wittmeyer, E. K. Alban, W. A. Gould, R. G. Hill, Jr., H. A. Rollins, Jr., J. L. Caldwell, D. C. Kiplinger, K. W. Reisch; second row: T. C. McDowell, J. D. Utzinger, M. J. White, A. C. Peng, W. L. George, Jr., G. A. Cahoon, S. Z. Berry, W. M. Brooks, D. W. Kretchman, E. M. Smith; third row: J. R. Geisman, J. M. Martin, D. E. Crean, P. C. Kozel, J. F. Gallander, D. C. Ferree, W. L. Bauerle, Jr., G. L. Staby, M. Kawase, H. K. Tayama; missing: F. K. Buscher, F. O. Hartman, A. R. Mosley, W. A. Oitto.

FACULTY - DEPARTMENT OF HORTICULTURE
May 1, 1972

Name Year Appointed (Current Rank)	Degrees	Assignment R	 T	 E	Area of Specialization
Alban, E.K. 1946 (Professor)	BA Denison '36 MS OSU '43 PhD OSU '45	15	85	-	Commercial Veg. Production and Weed Control
Bauerle, W.L., Jr. 1970 (Assist. Prof.)	BS Del Val '64 MS Rutgers '66 PhD Cornell '70	100	-	-	Commercial Greenhouse Vegetable Crops
Berry, S.Z. 1967 (Assoc. Prof.)	BS Cornell '52 MS UNH '53 PhD U of Cal '57	100	-	-	Processing Tomato Variety Development
Brooks, W.M. 1958 (Assoc. Prof.)	BS OU '54 MS OSU '57	-	-	100	Comm. Outdoor and Greenhouse Veg. Crop Production
Buscher, F.K. 1956 (Assist. Prof.)	BS OSU '50 MS OSU '65	-	-	100	Nursery Crop Production
		(Area Agent)			
Cahoon, G.A. 1963 (Professor)	BS Utah SU '50 PhD U of Cal '54	70	-	30	Grape Prod. and Tree Fruit Nutrition
Caldwell, J.L. 1955 (Professor)	BS OSU '53 MS OSU '54	-	-	100	Landscape Hort. - Home Grounds
Crean, D.C. 1969 (Assist. Prof.)	BA U of Cambridge '60 MA U of Cambridge '66 PhD OSU '69	50	50	-	Food Tech - Chem. Comp. of Hort. Crops
Ferree, D.C. 1971 (Assist. Prof.)	BS Penn State '65 MS U of Maryland '68 PhD U of Maryland '69	100	-	-	Tree Fruit Prod.
Ferree, M.E. 1972 (Assist. Prof.)	BS Clemson '65 MS Clemson '67 PhD VPI '70	-	-	100	Fruit Crops Prod.

Name Year Appointed (Current Rank)	Degrees	Assignment R	 T	 E	Area of Specialization
Gallander, J.F. 1963 (Assoc. Prof.)	BS OSU '60 PhD OSU '64	100	-	-	Food Technology Fruit Products
Geisman, J.R. 1958 (Professor)	BS OSU '55 MS OSU '56 PhD OSU '58	50	50	-	Food Technology Waste Disposal
George, W.L., Jr. 1971 (Assoc. Prof.)	BS Del Val '60 MS Rutgers '62 PhD Rutgers '66	60	40	-	Greenhouse Vegetable Variety Development
Gould, W.A. 1947 (Professor)	BS U of N.H. '42 MS OSU '47 PhD OSU '49	50	50	-	Food Proc. and Tech. Emphasis on Vegetables
Hartman, F.O. 1948 (Professor)	BS U of Toledo '37 MS OSU '41 PhD OSU '51	15	85	-	Fruit Production
Hill, R.G., Jr. 1950 (Professor)	BS U of Maryland '45 MS U of Maryland '48 PhD U of Maryland '50	75	10	15	Assoc. Chairman Fruit Culture
Kawase, M. 1966 (Professor)	BS U of Tokyo '51 MA U of Tokyo '54 MS U of Minn. '58 PhD Cornell '60	100	-	-	Propagation Ornamental Plants
Kiplinger D.C. 1941 (Professor)	BS Iowa SC '37 MS OSU '38 PhD OSU '52	20	80	-	Floral Crop Production
Kozel, P.C. 1968 (Assoc. Prof.)	BS OSU '63 MS OSU '65 PhD Cornell '67	50	50	-	Landscape Hort. Plant Growth Regulators
Kretchman, D.W. 1963 (Professor)	BS MSU '53 MS MSU '54 PhD MSU '58	70	30	-	Veg. Crop Prod.
McDowell, T.C. 1968 (Assist. Prof.)	BS OSU '63 MS NCSU '65 PhD OSU '67	75	25	-	Floral Crop Prod.
Mosley, A.R. 1971 (Assist. Prof.)	BS U of K '65 MS U of K '68 PhD Ore. SU '72	75	-	25	Commercial Veg. Prod. Potatoes

Name Year Appointed (Current Rank)	Degrees	Assignment R	 T	 E	Area of Specialization
Oitto, W.A. 1966 (Assist. Prof.)	BS SDSU '41 U of Minn.	-	(USDA)	-	Pear Breeding
Peng, A.C. 1968 (Assist. Prof.)	BS WSU '61 MS MSU '62 PhD MSU '65	50	50	-	Food Tech. - Soy Protein Foods
Reisch, K.W. 1956 (Professor)	BS U of Conn. '52 MS OSU '53 PhD OSU '56	40	60	-	Landscape Hort.
Rollins, H.A., Jr. 1970 (Professor)	BS U of Conn. '50 MS U of NH '51 PhD OSU '54	25	50	25	Department Chairman
Smith, E.M. 1967 (Assoc. Prof.)	BS U of Conn. '58 MS OSU '64 PhD OSU '67	-	-	100	Nursery Crop Prod.
Staby, G.L. 1970 (Assist. Prof.)	BS U of Conn. '66 MS MSU '67 PhD MSU '70	35	-	65	Floral Crop Prod. Plant Growth Reg.
Tayama, H.K. 1964 (Professor)	BS U of Ill. '58 MS U of Ill. '59 PhD OSU '63	25	-	75	Floral Crop Prod.
Utzinger, J.D. 1967 (Assist. Prof.)	BS OSU '54 MS OSU '58 PhD OSU '69	-	25	75	Veg. Crop Prod. Youth Programs
White, J.M. 1970 (Assist. Prof.)	BS Clemson '61 MS Clemson '62 PhD OSU '70	-	- (Area Agent)	100	Commercial Veg. Crop Production
Wittmeyer, E.C. 1950 (Professor)	BS OSU '48 -- OSU --	-	-	100	Commercial Veg.

Department of Horticulture
Distribution of Time
May 1, 1972

	Teaching	Research	Extension	Total
Floriculture-Commercial				
Kiplinger	.80	.20		
McDowell	.15	.75		
Staby		.35	.65	
Tayama		.25	.75	
	.95	1.55	1.40	3.90
Food Technology-Commercial				
Crean	.40	.50		
Gallander		1.00		
Geisman	.20	.50		
Gould	.50	.50		
Peng	.50	.50		
	1.60	3.00		4.60
Landscape Horticulture-Commercial				
Kawase		1.00		
Kozel	.40	.50		
Reisch	.60	.40		
Smith			1.00	
	1.00	1.90	1.00	3.90
Pomology-Commercial				
Ferree, M.			1.00	
Cahoon		.70	.30	
Ferree, D.		1.00		
Hartman	.45	.15		
Hill		.20	.10	
	.45	2.05	1.40	3.90
Vegetable Crops				
Alban	.40	.15		
Bauerle		1.00		
Berry		1.00		
Brooks			1.00	
George	.20	.60		
Mosley		.75	.25	
Kretchman	.15	.70		
Wittmeyer			1.00	
	.75	4.20	2.25	7.20

	Teaching	Research	Extension	Total
General Hort.				
Alban	.45			
Caldwell			1.00	
Crean	.10			
George	.20			
Geisman	.30			
Hartman	.40			
Kozel	.10			
Kretchman	.15			
McDowell	.10			
Utzinger	.25		.75	
	2.05		1.75	3.80

	General
Administration	
Rollins	1.00
Hill	.70
	1.70

*Area Horticultural Extension Agents
Busher - Landscape Hort.
White - Vegetable Crops

Department of Horticulture

Faculty Publications Since 1966

Name & Yr. Appointed	Scientific Jour. Art.	OARDC Bul. & Cir.	Other Tech. Articles	Popular Articles	Ext. Publ.
Alban, E.K. - '46	3	1	26	3	4
Bauerle, W.L. Jr. - '70	1	-	16	1	-
Berry, S.Z. - '67	1	-	3	-	-
Brooks, W.M. - '58	-	-	6	2	4
Buscher, F.K. - '56	-	-	1	1	2
Cahoon, G.A. -'63	8	1	22	2	1
Caldwell, J.L. - '55	-	-	-	251	1
Crean, D.E. - '69	1	-	4	-	-
Ferree, D.C. - '71	1	-	1	-	-
Ferree, M.E. - '72	2	-	1	-	-
Gallander, J.F. - '63	3	1	23	3	1
Geisman, J.R. - '58	3	2	22	6	1
George, W.L. - '71 **	5	2	2	1	-
Gould, W.A. - '47 *	6	3	-	3	2
Hartman, F.O. - '48	2	-	15	-	-
Hill, R.G., Jr. - '50	-	-	31	4	6
Kawase, M. - '66 **	7	-	10	-	-
Kiplinger, D.C. - '41 *	5	-	46	5	12
Kozel, P.C. - '68	4	8	13	8	-
Kretchman, D.W. - '63 **	7	-	56	2	1
McDowell, T.C. - '68	2	5	22	8	3

Name & Yr. Appointed	Scientific Jour. Art.	OARDC Bul. & Cir.	Other Tech. Articles	Popular Articles	Ext. Publ.
Mosley, A.R. - '71	-	-	1	-	-
Oitto, W.A. - '66	6	-	2	-	-
Peng, A.C. - '68	5***	-	5	-	3
Reisch, K.W. - '56	4	1	25	10	6
Rollins, H.A., Jr. - '70	-	-	15	8	3
Smith, E.M. - '67	4	-	42	5	18
Staby, G.L. - '70	14	-	12	1	10
Tayama, H.K. '64	-	2	72	-	17
Utzinger, J.D. - '67	-	-	30	54	16
White, J.M. - '70	-	-	7	-	-
Wittmeyer, E.C. - '50	-	-	10	30	7

* Books (Gould, Kiplinger)
** Published Abstracts (George 5, Kawase 4, Kretchman 6)
*** Includes three patents in eleven different countries

EVAN KENNETH ALBAN

ACADEMIC RANK: Professor

TRAINING: B. A. - Denison University - 1936

M. S. - The Ohio State University - 1943

Ph.D. - The Ohio State University - 1945

AREA OF SPECIALIZATION: Vegetable crop physiology and herbicide studies with horticultural crops and soils.

DIVISION OF TIME: OARDC 18% OSU 82% CES --

PROFESSIONAL EXPERIENCE:

1945-1946 - Instructor Botany and Microbiology - Denison University
1945-1946 - Instructor Horticulture - The Ohio State University
1946-1949 - Assistant Professor Horticulture - OSU and OARDC
1949-1960 - Associate Professor - OSU and OARDC
1960- - Professor - OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Society of Plant Physiologists
American Association for Advancement of Science
Weed Society of America
American Institute for Biological Science
North Central Weed Control Conference
Ohio Academy of Science (Fellow)

Regularly Attend

Weed Society of America
North Central Weed Control Conference

WILLIAM L. BAUERLE

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - Delaware Valley College - 1964

M. S. - Rutgers, The State University

Ph.D. - Cornell University - 1970

AREA OF SPECIALIZATION: Greenhouse Vegetable Crops
Vegetable Crops

DIVISION OF TIME: OARDC 100% OSU -- CES --

PROFESSIONAL EXPERIENCE:

1970- Assistant Professor, OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science

Regularly Attend

North American Greenhouse Vegetable Conference
American Society for Horticultural Science

STANLEY Z. BERRY

ACADEMIC RANK: Associate Professor

TRAINING: B.S. - Cornell University - 1952

M.S. - University of New Hampshire - 1953

Ph.D. - University of California - 1957

AREA OF SPECIALIZATION: Vegetable breeding and variety evaluation; nature of, and utilization in breeding of, plant disease and physiologic resistances.

DIVISION OF TIME: OARDC 100 OSU -- CES --

PROFESSIONAL EXPERIENCE:

1957-60 - Research Scientist - Beltsville, Md. - USDA
1960-63 - Geneticist - Plant Pathologist - Riverston, N.J.- Campbell Soup Co.
1963-67 - Research A Associate - Davis, Calif. - Campbell Soup Co.
1967- - Associate Professor - OSU & OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Phytopathological Society
Sigma Xi
Tomato Genetics Cooperative
Tomato Breeders Round Table

Regularly Attend

Tomato Breeders Round Table Annual Conference

WILLIAM M. BROOKS

ACADEMIC RANK: Associate Professor

TRAINING: B. S. - Ohio University - 1954

M. S. - The Ohio State University - 1957

AREA OF SPECIALIZATION: Vegetable crop Physiology with emphasis on vegetables grown in greenhouses and outdoor vegetables grown for fresh market.

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1953-1956 - Research Assistant - OARDC
1956-1958 - Instructor - West Virginia University & Agricultural Experimental Station
1958- - Extension Horticulturist - OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Institute of Biological Sciences

Regularly Attend

American Society for Horticultural Science

FRED K. BUSCHER

ACADEMIC RANK: Assistant Professor

TRAINING: B.S. - The Ohio State University - 1950

AREA OF SPECIALIZATION: Commerical landscape horticulture with emphasis in turfgrass management, nursery stock production, landscape design and maintenance.

DIVISION OF TIME: OARDC OSU CES 100%

PROFESSIONAL EXPERIENCE:

1956-1957 - Associate County Agent, Cuyahoga County, Ohio
1957-1962 - County Extension Agent, Cuyahoga County, Ohio
1962-1968 - Area Extension Agent, Horticulture, Lorain, Cuyahoga, Lake and Ashtabula Counties.
1968- - Area Extension Agent, Horticulture, Wooster-Canfield Areas

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
Ohio Turfgrass Foundation

Sabbatical Leave

1960 One Quarter The Ohio State University
1964-1965 The Ohio State University

GARTH A. CAHOON

ACADEMIC RANK: Professor

TRAINING: B. S. - Utah State University - 1950

Ph. D. - Univ. of Calif., Los Angeles - 1954

AREA OF SPECIALIZATION: Plant nutrition, tree fruit, and grape physiology

DIVISION OF TIME: OARDC 70% OSU -- CES 30%

PROFESSIONAL EXPERIENCE:

1954-55 - Jr. Horticulturist - Univ. of Calif., Riverside, Calif.
1955-63 - Assist. Horticulturist - Univ. of Calif., Riverside, Calif.
1963-67 - Associate Professor - OARDC
1967- - Professor of Horticulture - OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
International Society for Horticultural Science
Indian Horticultural Society
Council on Soil Testing and Plant Analysis
Ohio State Horticultural Society

Regularly Attend

American Society for Horticultural Science
Council on Soil Testing and Plant Analysis
Ohio State Horticultural Society

Further Graduate or Post-Doctorate Study

-Consultant-Foliar Analysis - India, 1968, 1970

JAMES L. CALDWELL

ACADEMIC RANK: Professor

TRAINING: B. S. - The Ohio State University - 1952

M. S. - The Ohio State University - 1953

AREA OF SPECIALIZATION: Landscape Horticulture

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1956-1962 - Assistant Professor - OSU
1962-1971 - Associate Professor - OSU
1971- - Professor - OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Horticultural Society

DAVID E. CREAN

ACADEMIC RANK: Assistant Professor

TRAINING: B. A.(Hons.) - University of Cambridge - 1960

M. A. - University of Cambridge - 1966

Ph.D. - The Ohio State University - 1969

AREA OF SPECIALIZATION: Chemical composition of horticultural crops with special reference to carbohydrates and pherotic compounds.

DIVISION OF TIME: OARDC 50% OSU 50% CES --

PROFESSIONAL EXPERIENCE:

1960-1966 - Research Assistant - Scientific officer, The Fruit and Vegetable Preservation, Research Association, Chipping Campder, England
1967-1969 - Research Associate, OARDC
1969- - Assistant Professor of Horticulture, OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

Institute of Food Technologists
American Chemical Society (including membership in Divisions of Agricultural and Food Chemistry and of Pesticide Chemistry)
American Society for Horticultural Science
American Association for the Advancement of Science

Regularly Attend

Institute of Food Technologists

DAVID C. FERREE

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - The Pennsylvania State University - 1965

M. S. - University of Maryland - 1968

Ph.D. - University of Maryland - 1969

AREA OF SPECIALIZATION: Tree fruit physiology with emphasis on management of high density orchards.

DIVISION OF TIME: OARDC 100% OSU -- CES --

PROFESSIONAL EXPERIENCE:

1971 - Assistant Professor - Horticulture Department - OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
Dwarf Fruit Tree Association

Regularly Attend

American Society for Horticultural Science
Dwarf Fruit Tree Association

MAURICE E. FERREE

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - Clemson University - 1965

M. S. - Clemson University - 1967

Ph.D. - Virginia Poly Inst. - 1970

AREA OF SPECIALIZATION: Tree Fruit Physiology with emphasis on cultural practice and their effect on quality and productivity.

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1970-1971 - CPT, U.S. Arny Signal Corps
1972- - Extension Horticulture, Pomology, Horticulture Dept., OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

Dwarf Fruit Tree Assn.
Ohio State Horticultural Society

Regularly Attend

Dwarf Fruit Tree Assn.

JAMES F. GALLANDER

ACADEMIC RANK: Associate Professor

TRAINING: B. S. - The Ohio State University - 1960

Ph. D.- The Ohio State University - 1964

AREA OF SPECIALIZATION: Fruit processing with emphasis on determing the effect of variety, cultural practices and processing treatments on the quality of fruit products

DIVISION OF TIME: OARDC 100% OSU -- CES --

PROFESSIONAL EXPERIENCE:

1963-1964 - Instructor - OARDC
1964-1968 - Assistant Prof. - OARDC
1968- - Assoc. Prof. - OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

Institute of Food Technologists
American Society of Enologists
Ohio Valley - Institute of Food Technologists

Regularly Attend

Institute of Food Technologists
American Society of Enologists

JEAN R. GEISMAN

ACADEMIC RANK: Professor

TRAINING: B. S. - The Ohio State University - 1955

M. S. - The Ohio State University - 1956

Ph.D. - The Ohio State University - 1958

AREA OF SPECIALIZATION: Fruit and Vegetable Processing with emphasis on Sanitations, Waste Disposal, Fermentation and Radiation.

DIVISION OF TIME: OARDC 50% OSU 50% CES --

PROFESSIONAL EXPERIENCE:

1956-1958 - Research Assistant OARDC
1958-1963 - Assistant Professor OSU and OARDC
1963-1967 - Associate Professor OSU and OARDC
1967 - - Professor OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

Institute of Food Technologists
Ohio Valley Section Institute of Food Technologists
Phi Tau Sigma, National Honorary for Food Sciences
Institute for Sanitation Management

Regularly Attend

Institute of Food Technologists
National Symposiums on Food Processing Wastes

Further Graduate or Post-Doctorate Study

Oak Ridge Institute of Nuclear Studies - Four weeks training course on Radioistope Methodologies.

WILLIAM L. GEORGE, JR.

ACADEMIC RANK: Associate Professor

TRAINING: B. S. - Delaware Valley College of Science and Agriculture - 1960

M. S. - Rutgers-the State University - 1962

Ph.D. - Rutgers-the State University - 1966

AREA OF SPECIALIZATION: Genetics and breeding of greenhouse vegetable crops, development of new breeding systems in vegetable crops, developmental genetics of sex expressions in plants.

DIVISION OF TIME: OARDC 60% OSU 40% CES --

PROFESSIONAL EXPERIENCE:

1963-1966 - Research Assistant-Assistant Instructor - Rutgers University
1966-1971 - Assistant Geneticist-Connecticut Agricultural Experiment Station, New Haven
1971- - Associate Professor - OARDC and OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Genetic Association
American Society for Horticultural Science
Botanical Society of America
Genetics Society of America
Sigma Xi

Regularly Attend

American Society for Horticultural Science

WILBUR A. GOULD

ACADEMIC RANK: Professor

TRAINING: B. S. - Univ. of New Hampshire - 1942

M. S. - The Ohio State University - 1947

Ph.D. - The Ohio State University - 1949

AREA OF SPECIALIZATION: Food Processing and Technology with emphasis on vegetables and Food Laws & Regulations, quality control or evaluation and factory operations.

DIVISION OF TIME: OARDC 50% OSU 50% CES --

PROFESSIONAL EXPERIENCE:

1941-Summer - Plant Breedor - Ferry Morse Seed Co.
1942-1944 - U.S.D.A. Processed Foods Inspector
1945-1946 - U.S. Navy Fresh and Processed Food Inspector
1947-1948 - Instructor - OSU and OARDC
1948-1953 - Assistant Prof. OSU and OARDC
1953-1957 - Associate Prof. OSU and OARDC
1958- - Professor OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

Institute of Food Technologists, National, Ohio Valley and Lake Erie Section.
American Society for Qaulity Control
American Society for Association Executives
Ohio Canners and Food Processors Assn.
Council of Canning Assn. Executives

Regularly Attend

Institute of Food Technologists - National and Sectional
Council of Canning Assn. Executives

Further Graduate or Post-Doctorate Study

5 weeks - Germany-Italy Food Exposition and Conference - 1959

FRED O. HARTMAN

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Toledo - 1937

M. S. - The Ohio State University - 1941

Ph.D. - The Ohio State University - 1951

AREA OF SPECIALIZATION: Pomology - Fruit Setting, Fruit Thinning, Rootstocks, Anatomy and Morphology

DIVISION OF TIME: OARDC 15% OSU 85% CES --

PROFESSIONAL EXPERIENCE:

1946-1947 - Graduate Assistant - OSU
1947-1948 - Assistant - OSU and OARDC
1948-1951 - Instructor - OSU and OARDC
1951-1953 - Assistant Prof. - OSU and OARDC
1953-1962 - Associate Prof. - OSU and OARDC
1962- - Prof - OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Society for Horticultural Science (Tropical Region)
International Society for Horticultural Science
Dwarf Fruit Tree Association
American Pomological Society
Ohio State Horticultural Society

Regularly Attend

American Society for Horticultural Science
Dwarf Fruit Tree Association
Ohio State Horticultural Society

Further Graduate or Post-Doctorate Study

Winter Quarter - 1968 - Traveling and Studying Tropical, Subtropical and Temperate Fruit Production in Mexico.

ROBERT G. HILL, JR.

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Maryland 1945

M. S. - University of Maryland 1948

Ph.D. - University of Maryland 1950

AREA OF SPECIALIZATION: Stone and Small Fruit Culture

DIVISION OF TIME: OARDC 75% OSU 10% CES 15%

PROFESSIONAL EXPERIENCE:

1950-1957 - Assistant Professor Horticulture OARDC-OSU
1957-1960 - Associate Professor Horticulture OARDC-OSU
1960-1970 - Professor Horticulture OARDC-OSU
1970- - Professor & Associate Chairman Horticulture OARDC-OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
International Society for Horticultural Science
American Society of Plant Physiologists
Weed Society of America
Dwarf Fruit Tree Association
Ohio State Horticultural Society

Regularly Attend

American Society for Horticultural Science

Sabbatical Leave

1963-1964 - Scottish Horticultural Research Institute

MAKOTO KAWASE

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Tokyo - 1951

B. A. - University of Tokyo - 1954

M. S. - University of Minnesota - 1958

Ph.D. - Cornell University - 1960

AREA OF SPECIALIZATION: Tree physiology with emphasis on 1. dormancy of trees, tubers, and seeds, 2. physiology of root initiation in cuttings, 3. enthylene and auxin metabolism in horticultural plants, 4. photoperiodic control of tree growth.

DIVISION OF TIME OARDC 100% OSU -- CES --

PROFESSIONAL EXPERIENCE:

1954-1956 - Lecturer - University of Tokyo
1962-1966 - Research Officer-Canada Dept. of Agriculture
1966-1970 - Associate Professor-OARDC and OSU
1970- - Professor - OARDC and OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Holly Soc.
Amer. Soc. Hort. Science
Amer. Soc. Plant Physiology
Int. Soc. Hort. Sci.
Int. Plant Propagator's Soc.
Int. Shade Tree Conf.
Scandinavian Soc. Plant Physiologists

Regularly Attend

Amer. Soc. Hort. Sci.
Int. Plant Prop. Soc.
Amer. Holly Soc.

Further Graduate or Post-Doctorate Study

Post doctoral work in Plant Physiology under Dr. A. C. Leopold at Purdue University in 1960-1962.

D. C. KIPLINGER

ACADEMIC RANK: Professor

TRAINING: B. S. - Iowa State College-1937

M. S. - The Ohio State University-1938

Ph.D. - The Ohio State University-1952

AREA OF SPECIALIZATION: Nutrition and physiology of Floricultural plants

DIVISION OF TIME: OARDC 20% OSU 80% CES --

PROFESSIONAL EXPERIENCE:

1937-1938 - Student Laborer
1938-1940 - Graduate Assistant
1940-1941 - Assistant in Floriculture
1941-1946 - Assistant Professor - OSU and CES
1946-1952 - Assistant Professor - OSU, OARDC and CES
1952-1958 - Associate Professor - OSU and OARDC
1958- - Professor - OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
Society of American Florists
Ohio Florists' Association

Regularly Attend

Ohio Florist's Association

PHILIP C. KOZEL

ACADEMIC RANK: Associate Professor

TRAINING: B. S. - The Ohio State University - 1963

M. S. - The Ohio State University - 1965

Ph.D. - Cornell University - 1967

AREA OF SPECIALIZATION: Plant growth regulations with emphasis on woody ornamental plants. Horticulture Landscape.

DIVISION OF TIME: OARDC 50% OSU 50% CES --

PROFESSIONAL EXPERIENCE:

1968-1971 - Assistant Professor, OSU and OARDC
1971- - Associate Professor, OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

The American Society for Horticultural Science
Sigma Xi
Phi Alpha Xi
International Plant Propagators Society
International Shade Tree Conference

DALE W. KRETCHMAN

ACADEMIC RANK: Professor

TRAINING: B. S. - Michigan State University - 1953

M. S. - Michigan State University - 1954

Ph.D. - Michigan State University - 1958

AREA OF SPECIALIZATION: Culture and Physiology at Processing Vegetable Crops; Post-Harvest Physiology of Horticultural Crops.

DIVISION OF TIME: OARDC 70% OSU 30% CES --

PROFESSIONAL EXPERIENCE:

1958-1963 - Assistant Horticulturist, Florida Citrus Experiment Station, Lake Alfred
1963-1967 - Associate Professor, OARDC and OSU
1967- - Professor, OARDC and OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
The Society of the Sigma Xi
The Michigan State Horticultural Society (Life Member)
The Florida State Horticultural Society
The Ohio State Horticultural Society

Regularly Attend

American Society for Horticultural Science
The Ohio State Horticultural Society

Further Graduate or Post-Doctorate Study

Study tours of the processing vegetable industries of California, North Carolina, New Jersey, Michigan, Indiana, and Ontario Canada during the summer of 1971.

THEODORE C. MCDOWELL

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - The Ohio State University - 1963

M. S. - The North Carolina State University at Raleigh - 1965

Ph.D. - The Ohio State University - 1967

AREA OF SPECIALIZATION: Growth Regulations and Floral Crops, Flower initiations and development, Inhibitors in Easter Lily bulbs.

DIVISION OF TIME OARDC 75% OSU 25% CES --

PROFESSIONAL EXPERIENCE:

1968-1972 - Assistant Professor Department of Horticulture OARDC and OSU

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Institute for Biological Science
The Ohio Academy of Science
American Association for the Advancement of Science
Ohio Florists' Association and OSU Floriculture Alumni Association
Brooklyn Botanic Garden, Pi Alpha Xi, Gamma Sigma Delta, Sigma Xi

Regularly Attend

Ohio Florists' Association Short Courses
Bedding Plants, Incorporated, National Meetings

A. R. MOSLEY

ACADEMIC RANK: Assistant Professor

TRAINING: B. A. - University of Kentucky - 1965

M. S. - University of Kentucky - 1968

Ph.D. - Oregon State University - 1972

AREA OF SPECIALIZATION: Vegetable culture and physiology with emphasis on potatoes and fresh market vegetables.

DIVISION OF TIME: OARDC 75% OSU -- CES 25%

PROFESSIONAL EXPERIENCE:

October, 1971 - Assistant Professor Horticulture, OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science

Regularly Attend

American Society for Horticultural Science

WILLIAM A. OITTO

ACADEMIC RANK: Adjunct Assistant Professor

TRAINING: B. S. - South Dakota State University - 1941

---- -- University of Minnesota Graduate School - 1946-50 (No Degree)

AREA OF SPECIALIZATION: Horticultural Plant Breeding
Breeding winter-hardy tree fruits
breeding pears for high quality & Fire blight resistance

DIVISION OF TIME: OARDC 100% (USDA) OSU -- CES --

PROFESSIONAL EXPERIENCE:

1956-1965 - Research Horticulturist, USDA Northern Great Plains Research Center, Mandan, N. Dak.
1966-date - Research Horticulturist, USDA, OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Pomological Society
Pear Breeders Conference

Regularly Attend

Pear Breeders Conference

ANDREW C. PENG

ACADEMIC RANK: Assistant Professor

TRAINING: Assoc. Degree in Hort. - University of Nanking, China - 1948

B. S. - Washington State University - 1961

M. S. - Michigan State University - 1962

Ph.D. - Michigan State University - 1965

AREA OF SPECIALIZATION: Phospholipids and soybean proteins

DIVISION OF TIME: OARDC 50% OSU 50% CES --

PROFESSIONAL EXPERIENCE:

1948-1949 - Associate Horticulturist, Taichung Agric. Expt. Station, Taiwan, China
1949-1952 - Inspector, Inspection Bureau of Agriculture and Forestry, Taiwan, China
1952-1956 - 2nd Lt., Chinese Nationalist Army, Taiwan, Chins
1956-1958 - Program Assistant, US Information Service, Taiwan, China
1965-1967 - Project Leader, Swift & Co. R & D Center, Chicago
1968-1970 - Assistant Professor, Dept of Horticulture, OSU & CES
1970- - Assistant Professor, Dept of Horticulture, OSU & OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

Institute of Food Technologists
American Oil Chemists' Society
American Association of Cereal Chemists

Regularly Attend

Institute of Food Technologists

KENNETH W. REISCH

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Connecticut - 1952

M. S. - The Ohio State University - 1953

Ph.D. - The Ohio State University - 1956

AREA OF SPECIALIZATION: Physiological and taxonomic aspects relating to woody landscape plants with emphasis on nutrition, viability, and plant indectification.

DIVISION OF TIME: OARDC 40% OSU 60% CES --

PROFESSIONAL EXPERIENCE:

1952 - Fellow, OSU
1953 - Instructor, OSU and OARDC
1956 - Assistant Professor, OSU and OARDC
1962 - Associate Professor, OSU and OARDC
1966 - Professor, OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
International Plant Propagator's Society
International Shade Tree Conference
American Association of Nurserymen
Nursery Association Executives

Regularly Attend

American Society for Horticultural Science
American Association of Nurserymen
Nursery Association Executives
Plant Propagator's Society

HOWARD A. ROLLINS, JR.

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Connecticut - 1950

M. S. - University of New Hampshire - 1951

Ph.D. - The Ohio State University - 1954

AREA OF SPECIALIZATION: Tree fruit physiology with emphasis on small than standard trees, orchard design, and pesticides in general.

DIVISION OF TIME: OARDC 25% OSU 50% CES 25%

PROFESSIONAL EXPERIENCE:

1954-1956 - Associate Horticulturist - Winchester Fruit Res. Lab-VPI
1956-1967 - Professor of Horticulture and Project Leader - Horticultural Extension - VPI
1967-1970 - Professor & Head - Department of Horticulture - VPI
1970- - Professor & Chairman - Department of Horticulture - OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Institute for Biological Science
Dwarf Fruit Tree Association
National Peach Council
Council on Pesticide Application

Regularly Attend

American Society for Horticultural Science
Dwarf Fruit Tree Association
Council on Pesticide Application

Further Graduate or Post-Doctorate Study

Six week study tour of European fruit production areas - 1964

ELTON M. SMITH

ACADEMIC RANK: Associate Professor

TRAINING: B. S. - University of Connecticut - 1958

M. S. - The Ohio State University - 1964

Ph.D. - The Ohio State University - 1967

AREA OF SPECIALIZATION: Landscape Horticulture

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1960-1962 - County Agriculture Extension Agent, Connecticut
1964-1967 - Teaching Assistant, OSU
1967-1970 - Assistant Professor, OSU
1971- - Associate Professor

PROFESSIONAL IMPROVEMENT:

Society Membership

Alpha Zeta
Sigma Xi
Gamma Sigma Delta
American Horticultural Society
International Shade Tree Conference

Regularly Attend

Pi Alpha Xi
American Society Horticultural Science
Ohio State Horticulture Alumni Society

GEORGE L. STABY

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - University of Connecticut - 1966

M. S. - Michigan State University - 1967

Ph.D. - Michigan State University - 1970

AREA OF SPECIALIZATION: Floriculture with emphasis on physiology and biochemistry of plant growth regulators.

DIVISION OF TIME: OARDC 35% OSU -- CES 65%

PROFESSIONAL EXPERIENCE:

1970 - Asst. Professor of Horticulture OSU & OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Association for the Advancement of Science
American Society for Horticultural Science
American Society of Plant Physiology
International Society for Horticultural Science
Gamma Sigma Delta
Alpha Zeta
Pi Alpha Xi and Sigma Xi

Regularly Attend

American Society for Horticultural Science
American Society for Plant Physiology

HARRY K. TAYAMA

ACADEMIC RANK: Professor

TRAINING: B. S. - University of Illinois - 1958

M. S. - University of Illinois - 1959

Ph.D. - The Ohio State University - 1963

AREA OF SPECIALIZATION: Commercial floriculture. Environmental effects, growth regulators, and pesticides.

DIVISION OF TIME: OARDC 25% OSU -- CES 75%

PROFESSIONAL EXPERIENCE:

1963-1964 - Assistant Professor, The Penn State University, OSU
1964-1967 - Assistant Professor, OSU
1967-1970 - Associate Professor, OSU and OARDC
1970- - Professor, OSU and OARDC

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science

JAMES D. UTZINGER

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - The Ohio State University - 1954-1959

M. S. - The Ohio State University - 1958

Ph.D. - The Ohio State University - 1969

AREA OF SPECIALIZATION: Horticultural Education, Fruit and Vegetable Extension Programs for youth and amateur Horticulturists

DIVISION OF TIME: OARDC -- OSU 25% CES 75%

PROFESSIONAL EXPERIENCE:

1959-1965 - Secondary School Physical and Biological Science Teacher
1965-1967 - Secondary School Vocational Horticulture Teacher
1967- - Assistant Professor and Extension Horticulturist, The Ohio State University

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
Ohio Vegetable and Potato Growers Association
Ohio State Horticultural Society
Columbus Vegetable Growers Association

Regularly Attend

Columbus Vegetable Growers Association
Ohio Vegetable and Potato Growers Association
Ohio State Horticultural Society

J. MARION WHITE

ACADEMIC RANK: Assistant Professor

TRAINING: B. S. - Clemson University - 1961

M. S. - Clemson University - 1962

Ph.D. - The Ohio State University - 1970

AREA OF SPECIALIZATION: Vegetable crop production with emphasis in tomato plant breeding.

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1967-1969 - Technical Service Representative, E-Z-Flo Chemical Co.
1970- - Area Extension Agent, Horticulture, Ohio cooperative Extension Service

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
Tomato Genetics Cooperative
The Society of the Sigma Xi
Ohio Cooperative Extension Agents Association

Regularly Attend

Ohio Cooperative Extension Agents Association

E. C. WITTMEYER

ACADEMIC RANK: Professor

TRAINING: B. S. - Ohio State University

---- - Graduate work at OSU (47 hours) but M. S. not completed

AREA OF SPECIALIZATION: Vegetables and potatoes. Cultural practices.

DIVISION OF TIME: OARDC -- OSU -- CES 100%

PROFESSIONAL EXPERIENCE:

1948-1950 - Agronomist, American Agricultural Chemical Co., Detroit, Michigan
1950-1972 - Extension Horticulturist, OSU
1954-1969 - Secretary of the Ohio Vegetable and Potato Growers Assn.
1969- - Educational advisor, Ohio Vegetable and Potato Growers Association

PROFESSIONAL IMPROVEMENT:

Society Membership

American Society for Horticultural Science
American Society of Agronomy
Potato Association of America
European Association for Potato Research
Florida Horticultural Society

Regularly Attend

American Society for Horticultural Science
Potato Association of America

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